

icountMS Range

Fluid Condition Monitoring –
Moisture Sensors



**An essential
component of
any predictive
maintenance
programme**

**Fast, reliable and accurate
inline detection of moisture
in fluids**

MS moisture sensors provide fast, reliable and accurate inline detection of moisture in fluids. Technology developed for preventative maintenance programmes. MS150 is the 'low pressure' option for suction line/reservoir applications. MS200 is the 'Programmable' sensor monitoring and reporting relative humidity (RH), moisture content in oils. MS300 'Intrinsically safe' sensor ATEX certified for use in hazardous Zone 0 environments.

Contact Information:

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Product Features:

- MS moisture sensors provide fast, reliable and accurate inline detection of moisture in fluids.
- Technology developed for preventative maintenance programmes.
- MS150 'low pressure' suction/Return line applications. 10 bar maximum operating pressure.
- MS200 'Programmable' sensor monitoring and reporting relative humidity (RH), moisture content in oils. 420 bar MAOP.
- MS300 'Intrinsically safe' sensor ATEX certificated for use in hazardous Zone 0 environments. 420 bar MAOP.
- Temperature Outputs on all versions.



icountMS Range

Cost Effective Moisture Detection

Features & Benefits

- Continuous, online moisture indication, for hydraulic and lubricating systems.
- Reporting of % relative humidity of water content, giving the user information on how close to the fluids real saturation point.
- Reliable data on the rate of water absorption.
- Sensing cell technology using a laser trimmed thermoset polymer, for capacitive sensing that is capable of absorbing water molecules due to its micro porous structure.
- Uses a thermistor for temperature compensation correction. Offering total confidence in reporting the %RH relative humidity over the sensors temperature range.
- A purpose designed tee adaptor allows for easy installation into an existing fluid system.
- The MS200 can also be specified with a bench top wand offering the end user greater flexibility.
- Wand not available with MS150 or MS300

Typical Applications

- Ground support vehicles
- Pulp and paper plants
- Marine hydraulics
- Power transmission & distribution
- Forestry
- Industrial hydraulics
- Earth moving applications
- Agricultural
- Hazardous Areas (Zone 2)
- Theme parks (Ride hydraulics)



In-Line Moisture Measurement of Hydraulic & Lubricating Oils.

Parkers Moisture Sensor Range offers fast, reliable and accurate in-line detection of moisture in fluids. The MS transducer type technology has been especially designed with the preventative maintenance programme environment in mind.

The industry accepted sensing cell device will monitor and report Relative Humidity (RH), moisture content in oils. The water content measurement technique offers the end user benefits over the current standard form of water content reporting (PPM).

This allows for real time preventative maintenance to be undertaken and corrective actions to be made. By knowing that the water contamination is still within the oils absorbing range, less than 100%, reclaiming fluid properties before additive damage occurs can initiate calculable cost savings.



MS150 Moisture Sensor

Specification

Pressure:

Maximum allowable operating pressure. (MAOP): 10 bar (145 PSI).

Operating temperature:

Minimum: -20°C (-4°F).

Maximum: +85°C (+185°F).

Flow through sensor cell:

Installed in active flowstream.

Fluid compatibility:

Mineral oils and petroleum-based fluids

Viscosity range:

Unlimited.

Port connections:

1/4" BSPT or 1/4" NPT.

Connector Details:

M12x1 - 5 way

Supply voltage:

+8 to +30 Vdc.

Sensor size/weight/material:

80mm x 43mm/0.1kg/Aluminium

IP ratings:

IP68 % (When mated with moulded connector)

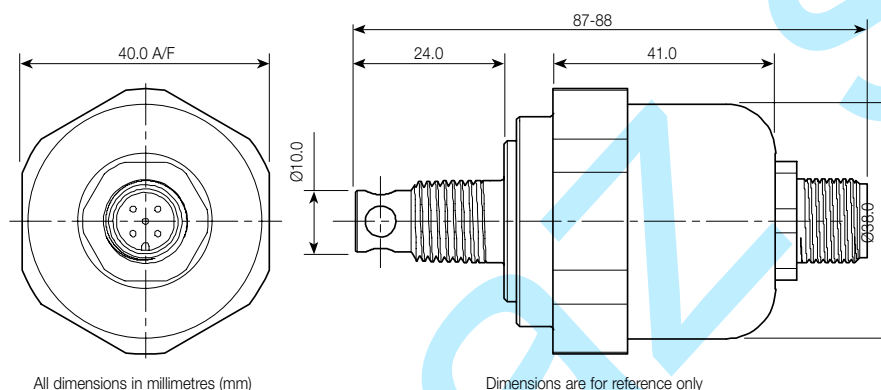
RH Outputs:

(+1 to +5 Vdc) or (4 to 20mA)

Temperature Outputs:

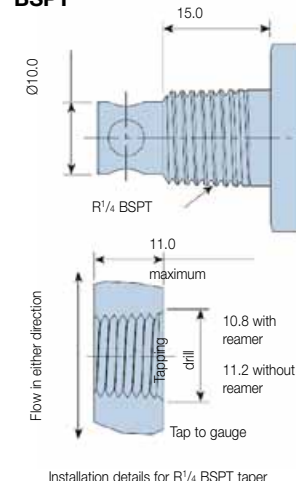
0 to +5 Vdc

Installation Details



Thread Form Options (MS150 + MS200)

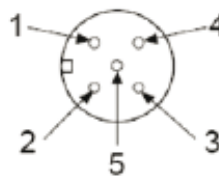
BSPT



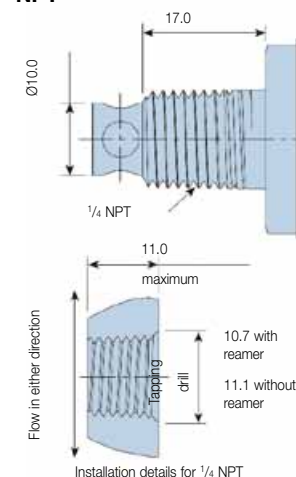
Sensor Outputs

MS150 moisture sensor pin designations			
Pin	Designation	I/O	Description
1	Supply	Input	Supply voltage (+8 to +30Vdc)
2	%RH	Output	% Saturation out (+1 to +5Vdc)
3	%RH	Output	% Saturation out (+4 to +20mA)
4	Temperature	Output	Temperature out (0 to +5Vdc)
5	Common	Input	Common (0Vdc) ground from power supply (not chassis ground)

MS150 Pin Designations



NPT



Interpreting the data

Oil type: Texaco Rando 46.

Saturation point: 400ppm @ 65°C (150°F).

At the above operating condition, the meter displays 100% saturation. As the meters scale indicates a reduction in the saturation percentage, there is also a corresponding reduction in PPM at a constant temperature. In the example above, a meter reading of 50% saturation could be interpreted as 200ppm at 65°C (150°F).

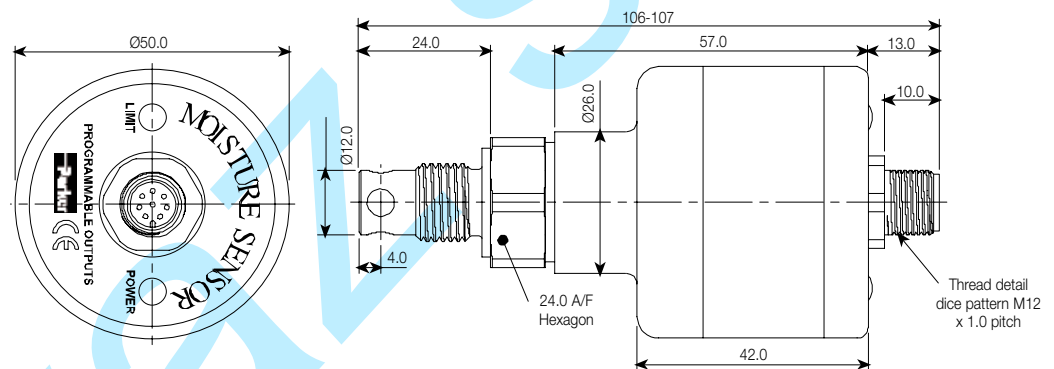
MS200 'Programmable'

Specification

% Saturation Calibration Accuracy:	+3% RH
Temperature Calibration Accuracy:	±1°C
Thermal Stability:	±1% RH (over compensated temperature range +10 to +80°C)
Stability:	±0.2% RH typical at 50% RH in 1 year
Linearity:	±0.5% RH typical
Analogue Output Hysteresis:	±0.5% RH Full Scale
Switched Output Hysteresis:	2% RH
Operating Temperature Range:	-40°C to +85°C (-40 to +185°F)
Operating Humidity Range:	5 to 100% RH (non condensing)
Response Time:	60 sec in slow moving air at 25°C
Maximum rated pressure:	420 Bar (6000 PSI)
Maximum torque on spanner flats:	30 Nm (ONLY USE SPANNER FLATS TO INSTALL AND REMOVE THE MOISTURE SENSOR)
Seal Material (depending on MS):	Fluorocarbon, EPDM, Perfluoroelastomer
Material:	Stainless Steel 303
Connector Details:	M12x1, 8 Way, IP67 Connector (IP68 when mated with moulded cable)
Maximum Cable Length:	10 Metres with Voltage Output 100 Metres with Current Output
Output:	SEE ORDERING INFORMATION

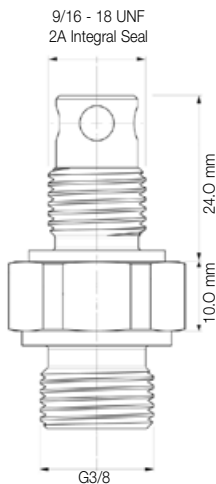
Installation Details

All dimensions in millimetres (mm)
Dimensions are for reference only

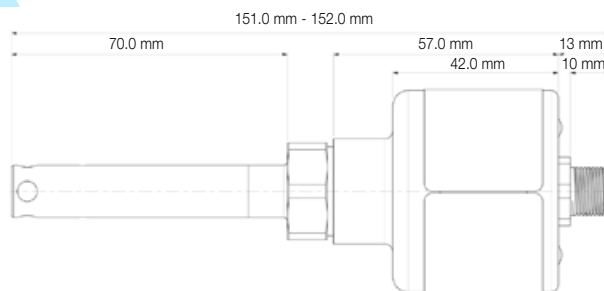


Thread Form Options and Hand-Held Unit (See MS Ordering Information)

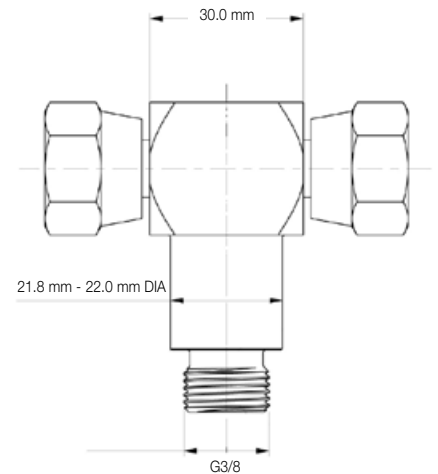
Thread Form Option 5



Hand Held Unit/Extended Probe Option 6



Thread Form Option 7

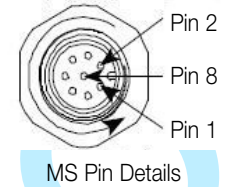


MS200 'Programmable'

Moisture Sensor Wiring and Pin Designations

Pin	Designation	I/O	Description
1	Alarm Switch	Output	Alarm Switch. Constant 5Vdc when in normal operation. Switch to 0Vdc when in alarm condition. Red LED illuminates when Sensor is in an alarm condition.
2	Analogue	Output	Temperature - Degf Celsius. User Select Output (0-3Vdc, 0-5Vdc, 1-6Vdc and 4-20mA).
3	Alarm Limit	Output	Alarm Limit (0-6V). Output that directly corresponds to the alarm set point.
4	Analogue	Output	% Saturation. User Select Output (0-3Vdc, 0-5Vdc, 1-6Vdc and 4-20mA).
5	Receive	Input	RS232 Communication.
6	Send	Output	RS232 Communication.
7	Common	Input	Common (0Vdc). Ground from power supply.
8	Supply	Input	Supply Voltage (+8 to +30Vdc). Green LED illuminates when power is properly applied.

M12, 8 Way Connector



MS300 Intrinsically Safe

Specification

Pressure:

Maximum allowable operating pressure.
(MAOP): 420 bar (6000 PSI).

Operating temperature:

Minimum: -40°C (-40°F) - dependent on seal material.
Maximum: +85°C (+185°F).

Flow through sensor cell:

Installed in active flowstream.

Fluid compatibility:

Mineral oils, petroleum-based and Phosphate ester-Skydrol option available.

Viscosity range:

Unlimited.

Thread form connections:

See ordering information.

Outputs:

4-20mA (current loop).

Calibration accuracy:

+/- 5% RH

Compensated thermal stability:

+/- 1% RH (+ 10°C to +80°C)

Materials:

Stainless steel 303.

Sensor size/weight:

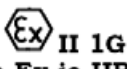

107mm x ø50mm/0.3Kg.

IP ratings:

IP68 (with specified moulded cable)

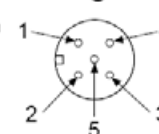
Developed in association with Triteq Ltd.

Installation Details – See MS300 Manual



 Sir a 07ATEX2255
 IECEx SIR 07.0089

Moisture Sensor Connection Diagram

1. Supply (4-20 mA - IN) - Brown
2. Signal (4-20 mA - OUT) - White
3. Not Used - Blue
4. Not Used - Black
5. Not Used - Grey



MS300 Intrinsically Safe

Installation details continued

The MS300 has been certified as Intrinsically Safe Electrical Apparatus and offers fast, reliable and accurate in-line detection of moisture in fluids for use in hazardous areas.

ATEX Certification (See page 71) allows the MS300 into areas of a potentially explosive atmosphere, that have previously not been allowed without permits, it is intended for use in Zone 0 hazardous areas requiring the use of category 1G equipment and has been designed for use with galvanic isolators to the specified values stated below:

The electrical parameters: U_i : 28V I_i : 93mA P_i : 0.65W C_i : 380nF L_i : 0

The following instructions apply to MS300 - 4-20mA Current Loop Moisture Sensor covered by certificate number Sira 07ATEX2255:

1. The equipment may be located where flammable gases of Group I may be present. The equipment is only certified for use in ambient temperatures in the range -20°C to $+40^{\circ}\text{C}$ and should not be used outside this range.
2. The equipment has not been assessed as a safety-related device (as referred to by Directive 94/9/EC Annex II, clause 1.5).
3. Installation of this equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice.
4. Repair of this equipment shall be carried out by the manufacturer or in accordance with the applicable code of practice (IEC 60079-19).

Visual Indicators Specifications

Bar Graph Indicator (PBG8341A)

Construction:

Housing – nylon 6/6, window – acrylic,
bezel/board supports – ABS,
pins – phosphor bronze.

Power supply:

11 – 30 Vdc.

Signal input: (By dipswitch configuration)

Off – differential up to 5V.

A – single signal (Ref. 0V) up to 5V.

B – single signal (Ref. 1V) up to 6V.

Cut out size:

45.6mm x 45.6mm.

Fixing:

Push fit panel thickness 0.9mm to 3.2mm.

Sealing:

Designed to IP50 standard.

(Front face may be silicon sealed after LED configuration).

Scale:

Supplied 0 to 100% in horizontal.

Other scales, in volume, consult Parker Hannifin.

Scaling factors:

10% to 100% range. Fully adjustable.

Lamp intensity:

4mcd each.

Front viewing:

Polarised.

Weight:

29gms.

Alternative Indicator

Description	DDU1001	DDU1002
Power supply	11 - 30 Vdc	110 - 240 Vdc
Accuracy	$\pm 0.1\%$ typical	$\pm 0.1\%$ typical
Sample rate	2.5 per second	2.5 per second
Operating temp ($^{\circ}\text{C}$)	0 - 50	0 - 50
Storage temp ($^{\circ}\text{C}$)	-10 to +70	-10 to +70
Display	3.5 digit LED	3 1/2 digit LED
Power output (Vdc)	24	24
Weight (kg)	0.30	0.30
Panel cutout (mm)	93x45 ± 0.5	93x45 ± 0.5
Dimensions (mm)	48x96x93	48x96x93



PBG8341A



DDU1001/DDU1002

Product accessories part numbers

Product Number	Supersedes	Description	For MS type
DDU1001	NA	Digital display unit 22-55 Vdc	MS150, 200 + 300
DDU1002	NA	Digital display unit 110-240 Vdc	MS150, 200 + 300
PBG8341A	PBG.8341.1A	Bar Graph Indicator (+11 to +30 Vdc)	MS150, 200 + 300
ACC6NF003	NA	5 meter M12 X 1 - 5 pin moulded cable (IP68) Connector and flying leads	MS150 + 300
ACC6NF000	B97200	5 meter M12 X 1 - 8 pin moulded cable (IP68) Connector and flying leads	MS200
ACC6NF001	S970200	M12, 5 pin rewirable connector (IP65) connector only. No cable	MS150 + 300
ACC6NE008	S970400	UK 12 volt power supply	MS150, 200 + 300
ACC6NE009	S970400	European 12 volt power supply	MS150, 200 + 300
ACC6NE010	S970400	US 12 volt power supply	MS150, 200 + 300

Moisture sensor output setting

The Moisture sensor reports on the saturation levels of the fluid passing through the sensing cell. The output is a linear scale, reporting within the range of 5% saturation to 100% saturation.

Saturation	4-20mA	0-3Vdc	0-5Vdc
5%	4.8	0.15	0.25
25%	8	0.75	1.25
50%	12	1.50	2.50
75%	16	2.25	3.75
100%	20	3.00	5.00

Ordering Information

MS150 - Standard Product Table

Product Number	Supersedes	Fluid type	Thread Forms	Connector
MS1503	MS150-3	Mineral	R 1/4" BSPT Taper	M12 5 WAY
MS1504	MS150-4	Mineral	1/4" NPT Taper	M12 5 WAY

MS200 - Product Configurator

Key	Model	Fluid type	Output Options	Thread Forms	Connector	Future option
MS	2 Programmable	2 Mineral	01 0 - 3 Vdc	1 G 1/4" BSP Bonded Seal	1 M12 8 WAY	0 No
		6 Aggressive	02 0 - 5 Vdc	2 G 1/4" BSP Integral Seal		
			03 1 - 6 Vdc	3 R 1/4" Taper		
			04 4 - 20 mA	4 1/4" NPT Taper		
				5 9/16 - 18 UNF 2A Integral Seal		
				6 Hand Held Unit/extended probe		
				7 G 3/8" BSP Female Swivel Equal T adaptor		

MS200 - Standard Product Table

Key	Model	Fluid type	Output Options	Thread Forms	Connector	Future option
MS	2	2	02	1	1	0
MS	2	2	02	2	1	0
MS	2	2	02	3	1	0
MS	2	2	02	4	1	0
MS	2	2	02	5	1	0
MS	2	2	04	1	1	0
MS	2	2	04	2	1	0
MS	2	2	04	3	1	0
MS	2	2	04	4	1	0
MS	2	2	04	5	1	0

MS300 - Product Configurator

Key	Model	Fluid type	Output	Thread form	Connector	Future option
MS	3 Intrinsically Safe	2 Mineral	04 4 - 20 mA	1 G 1/4" BSP Bonded Seal	2 M12 5 WAY	1 None
		6 Aggressive		2 G 1/4" BSP Integral Seal		
				3 R 1/4" Taper Thread		
				4 1/4" NPT Taper Thread		
				5 9/16 - 18 UNF 2A Integral Seal		
				6 G 3/8" BSP Female Swivel Equal Tee		

MS300 - Standard Product Table

Key	Model	Fluid type	Output	Thread Forms	Connector	Future option
MS	3	2	04	1	2	1
MS	3	2	04	2	2	1
MS	3	2	04	3	2	1
MS	3	2	04	4	2	1
MS	3	2	04	5	2	1